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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/715,428	11/15/2000	Ole Bentz	500845.01	7717

27076 7590 09/20/2004

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EXAMINER	
WANG, JIN CHENG	
ART UNIT	**PAPER NUMBER**
2672	

DATE MAILED: 09/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/715,428	BENTZ, OLE	
	Examiner	Art Unit	
	Jin-Cheng Wang	2672	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05/17/2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 3-35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 3-35* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The amendment filed on 05/17/2004 has been entered. Claim 2 has been canceled. Claims 1, 3-35 are pending in the application.

Claim Objections

2. Claims 3 and 4 are objected to because of the following informalities: The claims 3 and 4 depend upon the canceled claim 2. Correction should be made such that the claims 3 and 4 instead depend upon the base claim 1. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1, and 3-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. For example, in line 11 of the Claim 1, the meaning of "a corresponding texture coordinate" is not clear, it could refer to an input texture coordinate, an output texture coordinate, or a calculated texture coordinate. Claims 3-9 depend upon the claim 1 and are rejected for their dependency on the claim 1.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 3, 10, 20-21, 25-28, and 33 are rejected under 35 U.S.C. 102(b) as being anticipated by Grossman et al. U.S. Pat. No. 5,230,039 (hereafter Grossman).

7. Claim 1:

Grossman teaches a method for calculating texture coordinates (i.e., manipulating pixel coordinates and handling out-of-range texture coordinates, see the abstract) in a graphics processing system (figure 1) for a texture map having a size and an acceptable range of coordinate values (i.e., the range of texture map), comprising:

Determining whether an input texture coordinate value is located within one of a plurality of predefined negative or positive input ranges or <u>the acceptable range of coordinate values</u> (see the abstract; column 9, lines 52-67, and column 10, lines 1-16);

Concurrently calculating a respective signed texture coordinate value for each of the predefined input ranges from the input texture coordinate value and the size of the texture map (*Grossman teaches calculating one of the border texture coordinates and the masked texture coordinates <u>concurrently</u> within the Span Processor 120. Grossman teaches calculating the texture coordinate values based on the mask registers to adjust <u>the size of the address space extending beyond the space of the stored texture map</u>; see column 10, wherein the calculated input texture coordinate is the masked texture coordinate with masked off bits in the outside*

mapping factor field. Moreover, the border texture coordinates are dependent upon the ranges of the input texture map and should be determined for each texture map. Therefore, the border texture coordinates are calculated based on the input texture coordinates and the ranges of the input texture map. The masked texture coordinates are determined for each selected texture mapping mode selected from a plurality of texture mapping modes such as the repeat mode, the clamping mode, and the select mode. The masked input texture coordinates are determined depending upon the input ranges of the texture map. Also because the masked texture coordinates are determined based on the size of the address space extending beyond the space of the stored texture map, the masked texture coordinates depend upon the size of the texture map);

Selecting from the concurrently calculated texture coordinate values and the input texture coordinate value which one to be provided as a corresponding texture coordinate (*Grossman teaches that, in the selection of a texture mapping mode from a plurality of texture mapping modes such as the repeat mode, the clamping mode and the select mode, the out-of-range input texture coordinates are selected for the repeat mode and the out-of-range input texture coordinates are suppressed or not being selected for the select mode. In the clamping mode, the selection of the output texture coordinates depends on the calculated border texture coordinates and the masked input texture coordinates. The output coordinate coordinates are calculated for the clamping mode based on the input texture coordinates and/or masked input texture coordinates and the border texture coordinates along with the sign bits. The masked input texture coordinates and the border texture coordinates are selected as output coordinates when the clamping mode is selected depending upon the ranges of the masked input texture coordinates and/or the sign bits of the masked input texture coordinates and/or the input texture*

coordiantes; column 10) based on the sign of the input texture coordinate value and the signs of the calculated texture coordinate values (*Grossman teaches selecting from the calculated border texture coordinates, masked texture coordinates and the input texture coordinates which one to be provided as an output texture coordinate based* ***<u>on the texture mapping mode</u>****, the signs of the masked texture coordinates and the sign of the input texture coordinate; column 9-10*).

- Note:
- Grossman teaches a plurality of predefined input ranges such as the input ranges for the input regions shown in figure 6 and/or each of the respective input ranges for each of the texture coordinate axis. Grossman teaches calculated texture coordinate values in terms of the border values of the texture map and/or the masked input texture coordinates in accordance to the ranges and sizes of the texture map. The border texture **<u>coordinates</u>** have been calculated with respect to each texture map.
- Grossman teaches selecting from the calculated texture coordinates (e.g., the border texture coordinates of the texture map and/or the masked input texture coordinates; these texture coordinates carry sign bits in addition to the outside mapping fields) and the input texture coordinates (e.g., the original or unmodified input coordinates) based on the texture mapping mode, the signs of the input texture coordinate (e.g., the sign bits of the input texture coordinates) and the signs of the calculated texture coordinates (e.g., the sign bits of the border coordinates as relating to each texture

map and/or the masked input texture coordinates as relating to each selected texture mapping mode).

- Grossman further teaches applying successive texture maps. In successive texture maps, the input texture coordinates are calculated for each of the plurality of texture mapping modes wherein the input texture coordinates for the next texture map are calculated as the output texture coordinates in the preceding texture map.

Claim 3:

The claim 3 encompasses the same scope of invention as that of claim 1 except additional claimed limitation of remapping being performed for each axis of the texture map. However, Grossman further discloses the claimed limitation of remapping being performed for *each axis* of the texture map (column 9, lines 10-41).

8. Claim 10:

Grossman teaches a method for calculating texture coordinates (i.e., manipulating pixel coordinates and handling out-of-range texture coordinates, see the abstract) in a graphics processing system (figure 1) for a texture map having a size from an input texture coordinate value located in one of a plurality of predefined input ranges, comprising:

Concurrently calculating a plurality of signed texture coordinate values corresponding to the plurality of predefined input coordinate ranges from the input texture coordinate value and the size of the texture map in accordance with the sign of the input coordinate value (*Grossman teaches calculating one of the border texture coordinates and the masked texture coordinates*

concurrently within the Span Processor 120. Grossman teaches calculating the texture coordinate values based on the mask registers to adjust the size of the address space extending beyond the space of the stored texture map; see column 10, wherein the calculated input texture coordinate is the masked texture coordinate with masked off bits in the outside mapping factor field. Moreover, the border texture coordinates are dependent upon the ranges of the input texture map and should be determined for each texture map. Therefore, the border texture coordinates are calculated based on the input texture coordinates and the ranges of the input texture map. The masked texture coordinates are determined for each selected texture mapping mode selected from a plurality of texture mapping modes such as the repeat mode, the clamping mode, and the select mode. The masked input texture coordinates are determined depending upon the input ranges of the texture map. Also because the masked texture coordinates are determined based on the size of the address space extending beyond the space of the stored texture map, the masked texture coordinates depend upon the size of the texture map);

Selecting an output texture coordinate from the plurality of concurrently calculated texture coordinate values and the input texture coordinate value (*Grossman teaches that, in the selection of a texture mapping mode from a plurality of texture mapping modes such as the repeat mode, the clamping mode and the select mode, the out-of-range input texture coordinates are selected for the repeat mode and the out-of-range input texture coordinates are suppressed or not being selected for the select mode. In the clamping mode, the selection of the output texture coordinates depends on the calculated border texture coordinates and the masked input texture coordinates. The output coordinate coordinates are calculated for the clamping mode based on the input texture coordinates and/or masked input texture coordinates and the border*

texture coordinates along with the sign bits. The masked input texture coordinates and the border texture coordinates are selected as output coordinates when the clamping mode is selected depending upon the ranges of the masked input texture coordinates and/or the sign bits of the masked input texture coordinates and/or the input texture coordiantes; column 10) based on the sign of the input texture coordinate value and the signs of the calculated texture coordinate values (*Grossman teaches selecting from the calculated border texture coordinates, masked texture coordinates and the input texture coordinates which one to be provided as an output texture coordinate based* ***on the texture mapping mode****, the signs of the masked texture coordinates and the sign of the input texture coordinate; column 9-10*).

Claim 20:

The claim 20 encompasses the same scope of invention as that of claim 10 except additional claimed limitation of determining, calculating, and selecting being repeated for each axis of the texture map. However, Grossman further discloses the claimed limitation of determining, calculating, and selecting being repeated for each axis of the texture map (column 11, lines 1-28).

9. Claim 21:

Grossman teaches a graphics processing system (figure 1), a method for calculating texture coordinates (i.e., manipulating pixel coordinates and handling out-of-range texture coordinates, see the abstract) that are within an acceptable range of texture coordinates of a texture map having a size, comprising:

Determining whether an input texture coordinate value is located in the acceptable range of texture coordinates, or in one of a plurality of negative or positive input ranges defined outside of the acceptable range of input values (see the abstract; column 9, lines 52-67, and column 10, lines 1-16);

Concurrently calculating a respective signed texture coordinate value for each of the negative input ranges or positive input ranges from the input texture coordinate value and the size of the texture map in accordance with the sign of the input texture coordinate (*Grossman teaches calculating one of the border texture coordinates and the masked texture coordinates* <u>*concurrently*</u> *within the Span Processor 120. Grossman teaches calculating the texture coordinate values based on the mask registers to adjust* <u>*the size of the address space extending beyond the space of the stored texture map*</u>*; see column 10, wherein the calculated input texture coordinate is the masked texture coordinate with masked off bits in the outside mapping factor field. Moreover, the border texture coordinates are dependent upon the ranges of the input texture map and should be determined for each texture map. Therefore, the border texture coordinates are calculated based on the input texture coordinates and the ranges of the input texture map. The masked texture coordinates are determined for each selected texture mapping mode selected from a plurality of texture mapping modes such as the repeat mode, the clamping mode, and the select mode. The masked input texture coordinates are determined depending upon the input ranges of the texture map. Also because the masked texture coordinates are determined based on the size of the address space extending beyond the space of the stored texture map, the masked texture coordinates depend upon the size of the texture map*); and

Selecting an output texture coordinate from the concurrently calculated coordinate values and the input texture coordinate (*Grossman teaches that, in the selection of a texture mapping mode from a plurality of texture mapping modes such as the repeat mode, the clamping mode and the select mode, the out-of-range input texture coordinates are selected for the repeat mode and the out-of-range input texture coordinates are suppressed or not being selected for the select mode. In the clamping mode, the selection of the output texture coordinates depends on the calculated border texture coordinates and the masked input texture coordinates. The output coordinate coordinates are calculated for the clamping mode based on the input texture coordinates and/or masked input texture coordinates and the border texture coordinates along with the sign bits. The masked input texture coordinates and the border texture coordinates are selected as output coordinates when the clamping mode is selected depending upon the ranges of the masked input texture coordinates and/or the sign bits of the masked input texture coordinates and/or the input texture coordiantes; column 10*) in accordance with the sign of the input texture coordinate, the signs of the calculated coordinate values and a selected addressing mode (*Grossman teaches selecting from the calculated border texture coordinates, masked texture coordinates and the input texture coordinates which one to be provided as an output texture coordinate based* ***<u>on the texture mapping mode</u>****, the signs of the masked texture coordinates and the sign of the input texture coordinate; column 9-10*).

Claim 25:

The claim 25 encompasses the same scope of invention as that of claim 21 except additional claimed limitation of determining, calculating, and selecting being repeated for each

axis of the texture map. However, Grossman further discloses the claimed limitation of determining, calculating, and selecting being repeated for each axis of the texture map (column 11, lines 1-28).

10. Claim 26:

Grossman has taught a texture address circuit (figures 4-5) for calculating texture coordinates for a texture map having a size and an acceptable range of input coordinate values (column 10, lines 28-49), the circuit comprising:

A plurality of coordinate calculation circuits (figure 4) corresponding to a plurality of input coordinate ranges defined outside of the acceptable range for both negative and positive input coordinate values (column 10, lines 28-49), each coordinate calculation circuit (Mask register 430 and compare register 432) coupled to receive a signal corresponding to the sign of the input coordinate value and a respective texture size value corresponding to a multiple of the size of the texture map (column 10, lines 28-49), each coordinate calculation circuit providing a respective signed coordinate output value (column 10, lines 28-49) calculated from the input texture coordinate value and the size of the texture map (*Grossman teaches calculating one of the border texture coordinates and the masked texture coordinates <u>concurrently</u> within the Span Processor 120. Grossman teaches calculating the texture coordinate values based on the mask registers to adjust <u>the size of the address space extending beyond the space of the stored texture map</u>; see column 10, wherein the calculated input texture coordinate is the masked texture coordinate with masked off bits in the outside mapping factor field. Moreover, the border texture coordinates are dependent upon the ranges of the input texture map and should be determined*

for each texture map. Therefore, the border texture coordinates are calculated based on the input texture coordinates and the ranges of the input texture map. The masked texture coordinates are determined for each selected texture mapping mode selected from a plurality of texture mapping modes such as the repeat mode, the clamping mode, and the select mode. The masked input texture coordinates are determined depending upon the input ranges of the texture map. Also because the masked texture coordinates are determined based on the size of the address space extending beyond the space of the stored texture map, the masked texture coordinates depend upon the size of the texture map);

A selection circuit (e.g., compare registers 432 and 433) coupled to concurrently receive as input values the input coordinate (column 10, lines 52-67) and the coordinate output values of the plurality of coordinate calculation circuits (column 11, lines 1-28), the selection circuit selecting one of the input values as an output texture coordinate value (*e.g., the compare value obtained from a compare register is tested against the masked value produced in processing block 503 and the result of this test determines whether or not an input coordinate is within a particular s, t coordinate range in which texturing is enabled. See column 11, lines 1-28*); and

Select logic (*figures 5a and 5b*) coupled to the selection circuit and further coupled to receive input signals corresponding the sign of the input coordinate value (e.g., the outside map factor field and the sign bit of the input coordinate is obtained at processing block 502) and the signs of the coordinate output values (*A mask value is obtained from mask register A or mask register B, see column 11, lines 1-7*), the select logic providing a selection signal commanding the selection circuit to select one of the input values as the output texture coordinate in accordance with the received input signals (*column 10, lines 52-67, and column 11, lines 1-28*).

Claim 27:

The claim 27 encompasses the same scope of invention as that of claim 26 except additional claimed limitation of the first and second coordinate calculation circuits of the plurality. However Grossman further discloses the claimed limitation of the first and second coordinate calculation circuits of the plurality (column 10, lines 52-67, and column 11, lines 1-28) comprising:

A negating circuit coupled to receive a respective texture size value and the signal corresponding to the sign of the input coordinate value, the negating circuit generating as an output value a positive or negative respective texture size value in accordance with the sign of the input coordinate value (column 10, lines 4-49); and

A summing circuit having a first input coupled to receive the output value of the negating circuit and a second input for receiving a second input value, the summing circuit further having an output to provide the sum of the output value of the negating circuit and a value received by at the second input (column 10, lines 52-67, and column 11, lines 1-28).

Claim 28:

Grossman teaches the negate circuit comprising an inverter and an exclusive OR gate (column 10, lines 52-67, and column 11, lines 1-28).

Claim 33:

Grossman teaches the select logic generates a selection signal to select the output texture coordinate (column 10, lines 52-67, and column 11, lines 1-28).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claims 4-9, 11-19, 22-24, 29-32, and 34-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grossman et al. U.S. Pat. No. 5,230,039.

13. Claims 4-9:

(a) The claims 4-9 encompasses the same scope of invention as that of claim 1 except additional claimed limitation of the specific formula for calculating the texture coordinates as recited in claims 4, 6, and 8 and the specific way of selecting the corresponding texture coordinates as recited in claims 5, 7 and 9.

(b) However, Grossman is silent on the specific formula for calculating the texture coordinates and the specific way of selecting the corresponding texture coordinates.

(c) The Dye reference has taught some specific formula for calculating the texture coordinates and some specific way of selecting the corresponding texture coordinates (see for example columns 25-36).

(d) It would have been obvious to one of ordinary skill in the art to have incorporated the Dye's specific formula for calculating the texture coordinates and specific way of selecting the corresponding texture coordinates into Grossman et al.'s texture addressing circuit because Grossman et al suggest the use of texture clamping (column 10, lines 4-16), the texture addressing circuit in figure 4, and the processing logic in figures 5a and 5b. With regards to the

specific formula for calculating the texture coordinates, Grossman et al. further suggest linear interpolation of texture coordinates (column 9, lines 5-9) and the field definitions within an input texture map coordinate that supports clamping and a multi-pass technique for tiling large texture maps wherein an field is used to expand the address space of textures beyond the zero to one coordinate range stored in a hardware texture map (column 9, lines 10-41). With regards to the specific way of selecting texture coordinates, Grossman et al. further suggest in the processing logic that the compare value obtained from a compare register is tested against the masked value produced in processing block 503 and the result of this test determines whether or not an input coordinate is within a particular s,t coordinate range in which texturing is enabled (column 11, lines 1-28). Finally, it would have been obvious to one of ordinary skill in the arts to have incorporated the specific formula of calculating texture coordinates together with the specific way of selecting texture coordinates for texture remapping (or clamping) so that out-of-range texture coordinates can be re-mapped to the range of a texture map including the border of the range of the texture map. It is noted that the Grossman's reference deal with the same subject matter relating to texture addressing circuit in a graphics processing system. Moreover, the formula used in selecting the corresponding texture coordinates for a mapping mode are Routine Experimentation. See *In re Karlson*, 136 USPQ 184, 186; 311 F2d 581 (CCPA 1963).

(e) One having the ordinary skill in the art would have been motivated to do this because it would have provided some formula for mapping the texture coordinates with the routine experimentation of the calculated values based on the input texture coordinates and thereby providing a means for controlling texture mapping of pixels outside the range of the texture map

(column 10, lines 4-16) and realistic portrayal of the actual finished product in texture mapping (column 1, lines 31-63).

14. Claims 11-16:

(a) The claims 11-16 encompasses the same scope of invention as that of claim 10 except additional claimed limitation of the specific formula for calculating the texture coordinates as recited in claims 11, 13, and 15 and the specific way of selecting the corresponding texture coordinates as recited in claims 12, 14 and 16.

(b) However, Grossman is silent on the specific formula for calculating the texture coordinates and the specific way of selecting the corresponding texture coordinates.

(c) The Dye reference has taught the specific formula for calculating the texture coordinates and the specific way of selecting the corresponding texture coordinates (see for example columns 25-36).

(d) It would have been obvious to one of ordinary skill in the art to have incorporated the Dye's specific formula for calculating the texture coordinates and specific way of selecting the corresponding texture coordinates into Grossman et al.'s texture addressing circuit because Grossman et al suggest the use of texture clamping (column 10, lines 4-16), the texture addressing circuit in figure 4, and the processing logic in figures 5a and 5b. With regards to the specific formula for calculating the texture coordinates, Grossman et al. further suggest linear interpolation of texture coordinates (column 9, lines 5-9) and the field definitions within an input texture map coordinate that supports clamping and a multi-pass technique for tiling large texture maps wherein an field is used to expand the address space of textures beyond the zero to one

coordinate range stored in a hardware texture map (column 9, lines 10-41). With regards to the specific way of selecting texture coordinates, Grossman et al. further suggest in the processing logic that the compare value obtained from a compare register is tested against the masked value produced in processing block 503 and the result of this test determines whether or not an input coordinate is within a particular s,t coordinate range in which texturing is enabled (column 11, lines 1-28). Finally, it would have been obvious to one of ordinary skill in the arts to have incorporated the specific formula of calculating texture coordinates together with the specific way of selecting texture coordinates for texture remapping (or clamping) so that out-of-range texture coordinates can be re-mapped to the range of a texture map including the border of the range of the texture map. It is noted that the Grossman's reference deal with the same subject matter relating to texture addressing circuit in a graphics processing system. Moreover, the formula used in selecting the corresponding texture coordinates for a mapping mode are Routine Experimentation. See *In re Karlson*, 136 USPQ 184, 186; 311 F2d 581 (CCPA 1963).

(e) One having the ordinary skill in the art would have been motivated to do this because it would have provided some formula for mapping the texture coordinates with the routine experimentation of the calculated values based on the input texture coordinates and thereby providing a means for controlling texture mapping of pixels outside the range of the texture map (column 10, lines 4-16) and realistic portrayal of the actual finished product in texture mapping (column 1, lines 31-63).

Claim 17:

The claim 17 encompasses the same scope of invention as that of claim 16 except additional claimed limitation of clamping the selected output texture coordinate comprising clamping the output texture coordinate to an edge value along an edge of the texture map. However, Grossman further discloses the claimed limitation of clamping the selected output texture coordinate comprising clamping the output texture coordinate to an edge value along an edge of the texture map (column 10, lines 4-16).

Claim 18:

The claim 18 encompasses the same scope of invention as that of claim 16 except additional claimed limitation of clamping the selected output texture coordinate comprising clamping the output texture coordinate to a border value one texel beyond the texture map. However, Grossman further discloses the claimed limitation of clamping the selected output texture coordinate comprising clamping the output texture coordinate to a border value one texel beyond the texture map (column 10, lines 4-16).

Claim 19:

The claim 19 encompasses the same scope of invention as that of claim 16 except additional claimed limitation of clamping the selected output texture coordinate comprising clamping the output texture coordinate to a border value half of a texel beyond the texture map. However, Grossman further discloses the claimed limitation of clamping the selected output texture coordinate comprising clamping the output texture coordinate to a border value half of a texel beyond the texture map (column 10, lines 4-16).

15. Claims 22-23:

(a) The claim 22 or 23 encompasses the same scope of invention as that of claim 21 except additional claimed limitation of the specific formula for calculating the texture coordinates as recited in claim 22 or the specific way of selecting the corresponding texture coordinates as recited in claim 23.

(b) However, Grossman is silent on the specific formula for calculating the texture coordinates and the specific way of selecting the corresponding texture coordinates.

(c) The Dye reference has taught the specific formula for calculating the texture coordinates and the specific way of selecting the corresponding texture coordinates (see for example columns 25-36).

(d) It would have been obvious to one of ordinary skill in the art to have incorporated the Dye's specific formula for calculating the texture coordinates and specific way of selecting the corresponding texture coordinates into Grossman et al.'s texture addressing circuit because Grossman et al suggest the use of texture clamping (column 10, lines 4-16), the texture addressing circuit in figure 4, and the processing logic in figures 5a and 5b. With regards to the specific formula for calculating the texture coordinates, Grossman et al. further suggest linear interpolation of texture coordinates (column 9, lines 5-9) and the field definitions within an input texture map coordinate that supports clamping and a multi-pass technique for tiling large texture maps wherein an field is used to expand the address space of textures beyond the zero to one coordinate range stored in a hardware texture map (column 9, lines 10-41). With regards to the specific way of selecting texture coordinates, Grossman et al. further suggest in the processing logic that the compare value obtained from a compare register is tested against the masked value produced in processing block 503 and the result of this test determines whether or not an input

coordinate is within a particular s,t coordinate range in which texturing is enabled (column 11, lines 1-28). Finally, it would have been obvious to one of ordinary skill in the arts to have incorporated the specific formula of calculating texture coordinates together with the specific way of selecting texture coordinates for texture remapping (or clamping) so that out-of-range texture coordinates can be re-mapped to the range of a texture map including the border of the range of the texture map. It is noted that the Grossman's reference deal with the same subject matter relating to texture addressing circuit in a graphics processing system. Moreover, the formula used in selecting the corresponding texture coordinates for a mapping mode are Routine Experimentation. See *In re Karlson*, 136 USPQ 184, 186; 311 F2d 581 (CCPA 1963).

(e) One having the ordinary skill in the art would have been motivated to do this because it would have provided some formula for mapping the texture coordinates with the routine experimentation of the calculated values based on the input texture coordinates and thereby providing a means for controlling texture mapping of pixels outside the range of the texture map (column 10, lines 4-16) and realistic portrayal of the actual finished product in texture mapping (column 1, lines 31-63).

Claim 24:

The claim 24 encompasses the same scope of invention as that of claim 23 except additional claimed limitation of clamping the selected output texture coordinate to a clamped value in the third addressing mode. However, Grossman further discloses the claimed limitation of clamping the selected output texture coordinate to a clamped value in the third addressing mode (column 10, lines 4-16).

16. Claims 29-32 and 34-35:

(a) The claims 29-32 and 34 encompasses the same scope of invention as that of claim 27 except additional claimed limitation of the specific formula for calculating the texture coordinates and the specific way of selecting the corresponding texture coordinates.

(b) However, Grossman is silent on the specific formula for calculating the texture coordinates and the specific way of selecting the corresponding texture coordinates.

(c) The Dye reference has taught the specific formula for calculating the texture coordinates and the specific way of selecting the corresponding texture coordinates (see for example columns 25-36).

(d) It would have been obvious to one of ordinary skill in the art to have incorporated the Dye's specific formula for calculating the texture coordinates and specific way of selecting the corresponding texture coordinates into Grossman et al.'s texture addressing circuit because Grossman et al suggest the use of texture clamping (column 10, lines 4-16), the texture addressing circuit in figure 4, and the processing logic in figures 5a and 5b. With regards to the specific formula for calculating the texture coordinates, Grossman et al. further suggest linear interpolation of texture coordinates (column 9, lines 5-9) and the field definitions within an input texture map coordinate that supports clamping and a multi-pass technique for tiling large texture maps wherein an field is used to expand the address space of textures beyond the zero to one coordinate range stored in a hardware texture map (column 9, lines 10-41). With regards to the specific way of selecting texture coordinates, Grossman et al. further suggest in the processing logic that the compare value obtained from a compare register is tested against the masked value

produced in processing block 503 and the result of this test determines whether or not an input coordinate is within a particular s,t coordinate range in which texturing is enabled (column 11, lines 1-28). Finally, it would have been obvious to one of ordinary skill in the arts to have incorporated the specific formula of calculating texture coordinates together with the specific way of selecting texture coordinates for texture remapping (or clamping) so that out-of-range texture coordinates can be re-mapped to the range of a texture map including the border of the range of the texture map. It is noted that the Grossman's reference deal with the same subject matter relating to texture addressing circuit in a graphics processing system. Moreover, the formula used in selecting the corresponding texture coordinates for a mapping mode are Routine Experimentation. See *In re Karlson*, 136 USPQ 184, 186; 311 F2d 581 (CCPA 1963).

(e) One having the ordinary skill in the art would have been motivated to do this because it would have provided some formula for mapping the texture coordinates with the routine experimentation of the calculated values based on the input texture coordinates and thereby providing a means for controlling texture mapping of pixels outside the range of the texture map (column 10, lines 4-16) and realistic portrayal of the actual finished product in texture mapping (column 1, lines 31-63).

Claim 35:

The claim 35 encompasses the same scope of invention as that of claim 34 except additional claimed limitation of a clamping circuit coupled to receive the output texture coordinate of the selection circuit when in the clamping mode and provide a clamped output texture coordinate. However, Grossman further discloses the claimed limitation of a clamping

circuit coupled to receive the output texture coordinate of the selection circuit when in the clamping mode and provide a clamped output texture coordinate (column 10, lines 4-16).

Remarks

17. Applicant's arguments, filed 05/17/2004, paper number 12, have been fully considered but they are not deemed to be persuasive.

18. Applicant argues in essence with respect to the Claim 1 and similar claims that:

(A) "The Examiner has argued that the 'texture values for the borders of the texture regions' described in the Grossman patent are analogous to the signed texture coordinate values that are concurrently calculated for each of the predefined input ranges. See the Office Action at page 3. However, this argument fails because the texture values for the borders are not calculated. They are merely set at zero for the zero border and the maximum binary value for the positive border. See col. 11, line 59-col. 12, line 12. The texture values of zero and the maximum binary value for the borders of texture regions do not change, regardless of the input texture coordinate value or the texture size."

In response to the arguments in (A), the border texture coordinates are calculated because the border texture coordinates are highly dependent on the ranges of the input texture map for each texture map. The border texture coordinates are determined from the ranges of the input texture map *<u>for each texture map</u>* and therefore, the border texture coordinates are calculated based on the input texture coordinates and the ranges of the input texture map *<u>for each texture map</u>*. Applicant argues that the border texture values are merely set at zero for the zero border

and the maximum binary value for the positive border. In this way, Applicant equates the border texture values to the coordinate fraction field of the input texture coordinates. Applicant's argument is incorrect because Applicant cannot equate the value as relating to a portion of a texture coordinate with a texture coordinate. The cited portion of Grossman discloses a portion of the texture coordinates such as the coordinate fraction field of the input coordinate is set to a value corresponding to the most positive address value of the texture map and setting the coordinate field to all ones operates to clamp the texture value of the out of range pixel to <u>the value stored at the most positive border of the texture map</u>. Grossman also discloses that the coordinate fraction field of the input coordinate is therefore set of all zeros and the negative input coordinate is thereby clamped to the least positive border or the zero border of the texture map. In view of Grossman's teaching, the most positive border or the least positive border of the texture map in Grossman refers to the texture coordinate in the format of Fig. 3a, rather than an outside map factor field or the value relating to the outside map factor field in the portion of a texture coordinate. Moreover, the most positive border of the texture map and the least positive border of the texture are still calculated for the different ranges of the texture map for each texture map. The fraction field of the input coordinates are set to the corresponding fraction field of the calculated border texture coordinates in according to the selected clamping mode.

Finally, it clear, from Grossman's teaching, that the border texture coordinates change with respect to the size of the texture map. In contrary to Applicant's argument that the texture values of zero and the maximum binary value for the borders of texture regions do not change with respect to the texture size, the border texture coordinates change with respect to the size of the texture map.

19. Applicant argues in essence with respect to the amended Claim 1 and similar claims that: (B) "One reason the Examiner's argument fails is because many of the 'calculated texture coordinate values' as characterized by the Examiner, namely, 'the border value sof the texture map or the masked input coordinate or the interpolated input coordinate or the manipulated texture coordinates,'...are not calculated texture coordinates from which the output texture coordinate is selected. For example, the 'masked input coordinate' appears to be a vlue resulting from the application of a mask stored in a mask register 430, 431 to an outside map factor value 307 that is one field of an input coordinate 301. See Figure 3a and col. 9, lines 33-39. The application of the mask to the outside map factor value is shown in Figure 5a as steps 501-503. See Figure 5a and col. 10, lines 65-col. 10, line 7. The resulting value, which the Examiner refers to as the 'masked input coordinate,' is compared at step 505 to a compare value stored in a comparator register 432, 433. A decision is made at step 510 based on the comparison to suppress the drawing of the textured pixel (steps 508, 509, 522, and 526) or to further determine whether to provide the input coordinate as the output texture coordinate (steps 506, 507, 511, 522, and 526) or to clamp the texture coordinate value (steps 506, 507, 512), and if so, to which border value to clamp (520, 523, 524, or 520, 525, 521). At no time is the 'masked input coordinate' value one of the values that can be selected as the output texture coordinate. It is merely a value that is compared with the compare value to determine whether the input coordinate is within a particular s, t coordinate range that is enabled."

In response to the arguments in (B), Grossman teaches calculating one of the border texture coordinates and the masked texture coordinates concurrently within the Span Processor 120. Grossman teaches calculating the texture coordinate coordinates based on the mask registers to adjust <u>the size of the address space extending beyond the space of the stored texture map;</u> column 10, wherein the calculated input texture coordinates are in the form of the masked texture coordinates. Note that the masked texture coordinates refer to the input texture coordinates with masked off bits in the outside map factor field 307.

Because the masked texture coordinates are highly dependent upon the texture mapping mode selected from a plurality of texture mapping modes such as the repeat mode, the clamping mode, and the select mode, the masked input texture coordinates are determined from the input ranges of the texture map. Also because the masked texture coordinates are determined based on the size of the address space extending beyond the space of the stored texture map, the masked texture coordinates are dependent upon the size of the texture map. Moreover, in the selection of a texture mapping mode from a plurality of texture mapping modes such as the repeat mode, the clamping mode and the select mode, the out-of-range input texture coordinates are selected for the repeat mode and the out-of-range input texture coordinates are suppressed or not being selected for the select mode. In the clamping mode, the selection of the output texture coordinates depends on the calculated border texture coordinates and the masked texture coordinates. The output coordinates are calculated for the clamping mode based on the sign bits of the input texture coordinates and/or masked input texture coordinates and/or the border texture coordinates. The masked input texture coordinates and the border texture coordinates are selected as output coordinate coordinates for the clamping mode depending upon the ranges of

the masked input texture coordiantes and/or the sign bits of the masked input texture coordinates; see column 10.

Clearly, Grossman teaches selecting from the calculated border texture coordinates, masked texture coordinates and the input texture coordinates which one to be provided as an output texture coordinate based on the texture mapping mode, the signs of the masked texture coordinates and the sign of the input texture coordinate; column 9-10.

20. Applicant argues in essence with respect to the amended Claim 1 and similar claims that:

(C) "With respect to the border values of the texture map, the value at the zero border and the value at the positive border are not signed values."

In response to the arguments in (C), the border texture coordinates are some specific examples of the texture coordinates in the format shown in Figure 3a, with each having the sign bits as well as the outside map factor field 307. Therefore, the border texture coordinates are signed values. **The zero border corresponds to the border texture coordinate having the coordinate fraction field setting to all zero and the positive border corresponds to the border texture coordinate having the coordinate fraction field setting to all ones**. The border coordinates still carry the sign bits in accordance to the Fig. 3a.

21. Applicant argues in essence with respect to the amended Claim 1 and similar claims that:

(D) "Thus, assuming for the moment that the border values are analogous to the calculated texture coordinate values, as argued by the Examiner, the Grossman patent

clearly does not disclose selecting an output texture coordinate from the calculated texture coordinates (i.e., the border values) and the input texture coordinate based on the sign of the input texture coordinate value and the signs of the calculated texture coordinates, as recited in claim 1."

In response to the arguments in (D), in the selection of a texture mapping mode from a plurality of texture mapping modes such as the repeat mode, the clamping mode and the select mode, the out-of-range input texture coordinates are selected for the repeat mode and the out-of-range input texture coordinates are suppressed or not being selected for the select mode. In the clamping mode, the selection of the output texture coordinates is highly dependent on the calculated border texture coordinates and the masked texture coordinates. The output texture coordinates are calculated for the clamping mode based on the input texture coordinates and/or masked input texture coordinates and/or the border texture values along with sign bits. The masked input texture coordinates and the border texture coordinates are selected as output coordinate for the clamping mode depending upon the ranges of and/or the sign bits of the masked input texture coordiantes; see column 10. Finally, Grossman teaches selecting from the calculated border texture coordinates, masked texture coordinate coordinates and the input texture coordinates which one to be provided as an output texture coordinate based on the texture mapping mode, the signs of the masked texture coordinates, the signs of the border texture coordinates and the sign of the input texture coordinate; column 9-10.

22. Applicant argues in essence with respect to the amended Claim 1 and similar claims that:

(E) "With respect to the 'masked input coordinate,' there is no discussion as it having a sign bit. It would be unlikely that there would be a sign bit associated with this value since neither the outside map factor 307 or the mask value that is applied to the outside map factor 307 are described as having a sign bit and the value is compared with an unsigned compare value stored in a comparator register."

In response to the arguments in (E), the masked texture coordinates refer to the input texture coordinates with masked off bits of the outside map factor field 307. Therefore, the masked texture coordinates are in the same format as the input texture coordinate as shown in Figure 3a having the sign bits as well as the outside map factor field 307.

23. Applicant argues in essence with respect to the amended Claim 4-9, 11-19, 22-24, 29-32, or 34 and 35 and similar claims that:

(F) "One simple reason is that the methods described in the Dye patent are directed to calculating a texel value (i.e., color) and not a texture coordinate. As previously discussed, based on the location (i.e., texture coordinate) of the interpolated texel, a texel value is calculated based on the proximity and color of the four nearest texels. The method of the Dye patent does not calculate a texture coordinate, but instead takes a texture coordinate as an input, and calculates a texel value...These different methods for calculating color values for texels are completely unrelated to the calculation of texture

coordinate values recited in the aforementioned claims, which are based on the input coordinate value and the size of the texture map."

In response to the arguments in (F), the texel is the same as the texture coordinate and the color value is just an example of the texel value or the texture coordinate value. Texel value is the value corresponding to a texture coordinate. Applicant's claim invention set forth some formula for mapping the texture coordinates. The formula used in selecting the corresponding texture coordinates for a mapping mode are resulted from Routine Experimentation. See *In re Karlson*, 136 USPQ 184, 186; 311 F2d 581 (CCPA 1963).

24. Applicant argues in essence with respect to the amended Claim 4-9, 11-19, 22-24, 29-32, or 34 and 35 and similar claims that:

(G) "Even if the Examiner's characterization of the Dye patent is considered to be accurate, it fails to make up for the deficiencies of the Grossman patent previously described with respect to claims 1, 3, 10, 20, 21, 25-28, and 33...the Dye patent purportedly teaches does not change the fact that the Grossman patent fails to at least disclose the concurrent calculation of signed texture coordinate values for each of the predefined input ranges from an input texture coordinate and the size of a texture map, and selecting from the input texture coordinate and the calculated signed texture coordinate values based on the sign of the input texture coordinate and the signs of the calculated texture coordinate values."

In response to the arguments in (G), the border textures are calculated because the border texture coordinates are highly dependent on the ranges of the input texture map for each texture map. The border texture coordinates are determined from the ranges of the input texture map *for each texture map* and therefore, the border texture coordinates are calculated based on the input texture coordinates and the ranges of the input texture map *for each texture map*. Grossman discloses a portion of the texture coordinates such as the coordinate fraction field of the input coordinate is set to a value corresponding to the most positive address value of the texture map and setting the coordinate field to all ones operates to clamp the texture value of the out of range pixel to the value stored at the most positive border of the texture map. Grossman also discloses that the coordinate fraction field of the input coordinate is therefore set of all zeros and the negative input coordinate is thereby clamped to the least positive border or the zero border of the texture map. In view of Grossman's teaching, the most positive border or the least positive border of the texture map in Grossman refers to the texture coordinate in the format of Fig. 3a, rather than an outside map factor field or the value relating to the outside map factor field in the portion of a texture coordinate. Moreover, the most positive border of the texture map and the least positive border of the texture are still calculated for the different ranges of the texture map for each texture map. The fraction field of the input coordinates are set to the corresponding fraction field of the calculated border texture coordinates in according to the selected clamping mode.

Finally, in the selection of a texture mapping mode from a plurality of texture mapping modes such as the repeat mode, the clamping mode and the select mode, the out-of-range input texture coordinates are selected for the repeat mode and the out-of-range input texture

coordinates are suppressed or not being selected for the select mode. In the clamping mode, the selection of the output texture coordinates is highly dependent on the calculated border texture coordinates and the masked texture coordinates. The output texture coordinates are calculated for the clamping mode based on the input texture coordinates and/or masked input texture coordinates and/or the border texture values along with sign bits. The masked input texture coordinates and the border texture coordinates are selected as output coordinate for the clamping mode depending upon the ranges of and/or the sign bits of the masked input texture coordiantes; see column 10. Finally, Grossman teaches selecting from the calculated border texture coordinates, masked texture coordinate coordinates and the input texture coordinates which one to be provided as an output texture coordinate **based on the texture mapping mode, the signs of the masked texture coordinates, the signs of the border texture coordinates and the sign of the input texture coordinate**; column 9-10.

Conclusion

25. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

26. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jin-Cheng Wang whose telephone number is (703) 605-1213. The examiner can normally be reached on 8:00 - 6:30 (Mon-Thu).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mike Razavi can be reached on (703) 305-4713. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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